UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>11 January 2005</u>.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-26</u> is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) <u>1-26</u> is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☒ All   b)☐ Some *   c)☐ None of:
      1.☒ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2.   Claims 15-18 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 15-17 are directed to "An encoded signal..." A "signal", as a form of energy, is not a statutory category of invention.

Claim 18 is directed to "A storage medium having stored thereon an encoded signal as claimed..." This too is nonstatutory because it encompasses non-functional descriptive material. That is, by simply storing a signal on a storage medium, no requisite functionality is present to satisfy the practical application requirement. The signal would not cause a computer to perform any function. In contrast, a storage medium comprising computer code that would cause a computer to code an audio signal to obtain an encoded signal would be statutory, because then the computer code would impart functionality when employed as a computer component.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4.   Claims 1-26 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

Regarding claims 1, 12, 13, 14, 15, 17, 19, and 23, the phrase "such as" renders

the claims indefinite because it is unclear whether the limitations following the phrase

are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   Claims 1-6, 14, 15, 18-20 and 23 are rejected under 35 U.S.C. 102(b) as being

anticipated by Kumaresan et al. (*On Representing Signals Using Only Timing*

Information).

In regard to claims 1 and 14, Kumaresan et al. disclose a method and encoder

for coding at least part of an audio signal in order to obtain an encoded signal

(analyzing speech using the RZC algorithm, page 2433, section VI), the method

comprising the steps of/means for:

predictive coding the at least part of the audio signal in order to obtain prediction

coefficients which represent temporal properties, such as a temporal envelope, of the at

least part of the audio signal (the RZC algorithm begins by performing LPSD, page

2431, section V-C; LPSD converts a signal to the spectral domain, then performs linear

prediction in the spectral domain to determine prediction coefficients which represent

the temporal envelope, pages 2427-2428, section IV and page 2422, section II-B, first

paragraph);

transforming the prediction coefficients into a set of times representing the

prediction coefficients (a set of zero crossing times e(t) are determined, pages 2431-

2432, section V-C and pages 2433-2434, section VI-A-1); and

including the set of times in the encoded signal (the zero crossing times are sent

along with additional information as the coded signal, pages 2431-2432, section V-C

and pages 2433-2434, section VI-A-1).

In regard to claim 2, Kumaresan et al. disclose the predictive coding is performed

by a using a filter and wherein the prediction coefficients are filter coefficients (inverse

filtering, pages 2427-2428, section IV).

In regard to claim 3, Kumaresan et al. disclose the predictive coding is a linear

predictive coding (linear prediction, pages 2427-2428, section IV).

In regard to claim 4, Kumaresan et al. disclose prior to the predictive coding step

a time domain to frequency domain transform is performed on the at least part of an

audio signal in order to obtain a frequency domain signal, and wherein the predictive

coding step is performed on the frequency domain signal rather than on the at least part

of an audio signal (the minimization performed in the LPSD algorithm in equation 33 is equivalent to performing linear prediction on the Fourier coefficients, i.e. performing predictive coding in the frequency domain, see 2427-2428, section IV and Conclusion section below).

In regard to claim 5, Kumaresan et al. disclose the times are time domain derivatives or equivalents of line spectral frequencies (the zero crossings are the time-domain analogs of LSF's, page 2423, section I-B-iii).

In regard to claim 6, Kumaresan et al. disclose the at least part of an audio signal is segmented in at least a first frame and a second frame and wherein the first frame and the second frame have an overlap including at least one time of each frame (the audio signal is windowed by Hamming windows with a 50% overlap, page 2433, section VI-A-1).

In regard to claims 15 and 18, Kumaresan et al. disclose an encoded signal and storage medium having stored thereon an encoded signal representing at least part of an audio signal, the encoded signal including a set of times representing prediction coefficients which prediction coefficients represent temporal properties, such as a temporal envelope, of the at least part of the audio signal (the RZC algorithm begins by performing LPSD, page 2431, section V-C; LPSD converts a signal to the spectral domain, then performs linear prediction in the spectral domain to determine prediction

coefficients which represent the temporal envelope, pages 2427-2428, section IV and page 2422, section II-B, first paragraph).

In regard to claims 19 and 23, Kumaresan et al. disclose a method of decoding and a decoder (synthesis, page 2434, section VI-2) an encoded signal representing at least part of an audio signal, the encoded signal including a set of times representing prediction coefficients which prediction coefficients represent temporal properties, such as a temporal envelope, of the at least part of the audio signal (the RZC algorithm begins by performing LPSD, page 2431, section V-C; LPSD converts a signal to the spectral domain, then performs linear prediction in the spectral domain to determine prediction coefficients which represent the temporal envelope, pages 2427-2428, section IV and page 2422, section II-B, first paragraph), the method/decoder comprising the steps of/means for:

deriving the temporal properties, such as the temporal envelope, from the set of times (the various components are used to reconstruct the model of the real signal, see Eq. 60, which includes the temporal envelope information, page 2434, section VI-2 and page 2427, section IV, showing the temporal envelope component of Eq. 60) and

using these temporal properties in order to obtain a decoded signal (the signal is reconstructed, page 2434, section VI-2), and

providing the decoded signal (the signal is output, page 2434, section VI-2).

In regard to claim 20, Kumaresan et al. disclose method comprises the step of transforming the set of times in order to obtain the prediction coefficients, and wherein the temporal properties are derived from the prediction coefficients rather than from the set of times (the zero-crossings are used to reconstruct $\alpha, \beta, \hat{\alpha}, and \hat{\beta}$ which represent the prediction coefficients derived in the encoding process, page 2434, section VI-2).

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumaresan et al., in view of Official Notice.

While Kumaresan et al. disclose a coder and a decoder for encoding and decoding a signal, Kumaresan et al. do not specifically disclose a receiver and transmitter as claimed in claims 25 and 26 for transmitting and receiving the encoded signal.

Official Notice is taken that incorporating a coding and decoding process into a transmitter and receiver, respectively, is notoriously well known in the art. Thus, the only difference between the claimed invention and the prior art is the combination of the elements in a single reference. One of ordinary skill in the art at the time of invention could have incorporated the coder and decoder into a transmitter and receiver

respectively by known methods and each element would have performed the same

function as they would separately. Furthermore, one of ordinary skill in the art at the

time of invention would have recognized that the combination would predictably result in

a system that would transmit and receive an encoded audio signal that was encoded

using the methods of encoding an audio signal disclosed by Kumaresan et al. Thus, it

would have been obvious to one of ordinary skill in the art at the time of invention to

incorporate the encoding and decoding methods disclosed by Kumaresan et al. into a

transmitter and receiver as known to those of ordinary skill in the art.

Conclusion

9.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. Kumaresan et al. (*Model-Based Approach to Envelope and*

Positive Instantaneous Frequency Estimation of Signals with Speech Applications)

disclose the LPSD algorithm in more detail and disclose the algorithm amounts to

performing linear prediction on the Fourier coefficients of a signal *s(t)* (see page 1917,

1st paragraph, left column). Herre (*Enhancing the Performance of Perceptual Audio*

Coders by Using Temporal Noise Shaping (TNS)) and Herre (U.S. Patent 5,781,888)

disclose a method that performs linear prediction in the frequency domain. Athineos et

al. (*Frequency-Domain Linear Prediction for Temporal Features*) is an intervening

reference published after Applicant's international filing date, but before Applicant's

national stage entry that discloses performing LPC analysis in the frequency domain.

10.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN L. ALBERTALLI whose telephone number is (571)272-7616. The examiner can normally be reached on Mon - Fri, 8:00 AM - 5:30 PM, every second Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BLA 4/25/08

          /David R Hudspeth/

          Supervisory Patent Examiner, Art Unit 2626